

Zeitschrift: IABSE congress report = Rapport du congrès AIPC = IVBH
Kongressbericht

Band: 12 (1984)

Artikel: Tests and analysis on the pedestrian suspended-slab bridge

Autor: Murakami, Yoshimaru / Nakazawa, Takao / Sezaki, Mitsuhiro

DOI: <https://doi.org/10.5169/seals-12257>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 22.02.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>



Tests and Analyses on the Pedestrian Suspended-Slab Bridge

Yoshimaru MURAKAMI

Prof. Dr.
Miyazaki Univ.
Miyazaki, Japan

Takao NAKAZAWA

Assoc. Prof., Dr.
Miyazaki Univ.
Miyazaki, Japan

Mitsuhiro SEZAKI

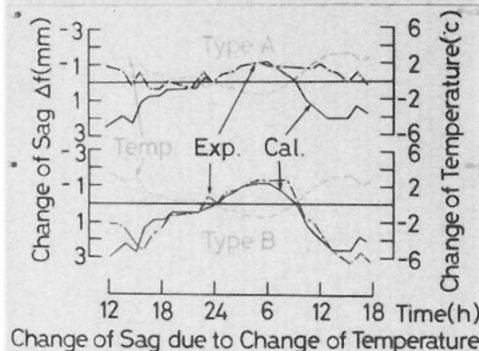
Res. Assoc.
Miyazaki Univ.
Miyazaki, Japan

A suspended-slab bridge (Spannband-Brücke) is essentially the same structural system as the suspended-roof in buildings. This type bridge is made by spanning of tendons which are lined with reinforced concrete to provide the rigidity as slab. Its advantage is not only applicable to long span, but also unnecessary to use the elements such as main towers, hangers and stiffened members in a conventional suspension bridge, and almost free from the maintenance works. However, these bridges are very few, because we have only an insufficient knowledge on their characteristics of deflection or vibration and the effects of cracking about such a structure.

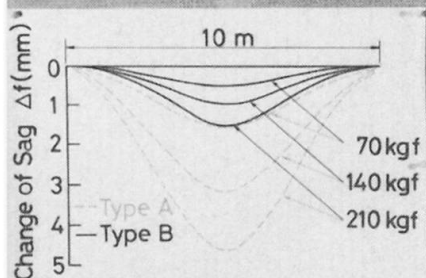
For these reasons, authors have conducted following experiments; firstly, to construct two model bridges of this type for pedestrians with a span of 10m and a width of 0.7m which were designed by using the span/sag ratio, 100 (Type A) and 50 (Type B), respectively; secondly, to investigate the behaviour of these bridges due to temperature variations and pedestrian-actions; thirdly, to measure the cracks relating to the sand-loading test; and finally, to execute the shaking test.

The main points obtained from the experimental results are summarized as follows; 1) cracks appeared in the slab near the bridge seat due to the mere change of temperature; 2) when static loading up to about 1.0t/m, which is 4.1 times as large as the design load, were applied, the number of cracks appeared in the slab was 77 in Type A per span length 10m (mean crack spacing $l_{mean}=13\text{cm}$; maximum crack width $w_{max}=0.8\text{mm}$ appeared near the bridge seat); and 71 in Type B ($l_{mean}=14\text{cm}$, $w_{max}=0.7\text{mm}$), respectively, but all these cracks closed after removing the load; 3) although the vibration mode was close to bending vibration in the case of no crack or few cracks, the mode approached to longitudinal vibration of tendons as the number of cracks were increasing, and the resonance frequency had a tendency to decrease; 4) smaller span/sag ratio is not only favorable for all mechanical properties such as deflection, vibration, cracking et al., but also economical.

TESTS & ANALYSES ON PEDESTRIAN SUSPENDED SLAB BRIDGE



Calculated results agree well with the experimental results.

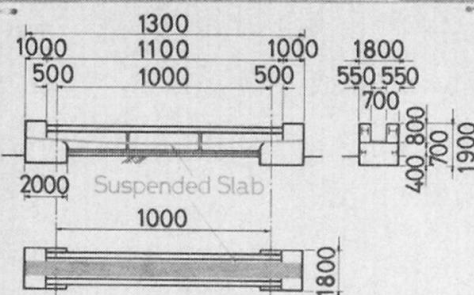


The principle of superposition is applicable. The change of sag of Type A is about three times as large as the change of sag of Type B.

Model Suspended Slab Bridges

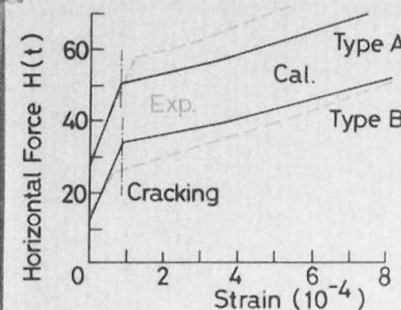


Left: Type A, Right: Type B
Span 10m, 10m
Sag 0.10m, 0.20m

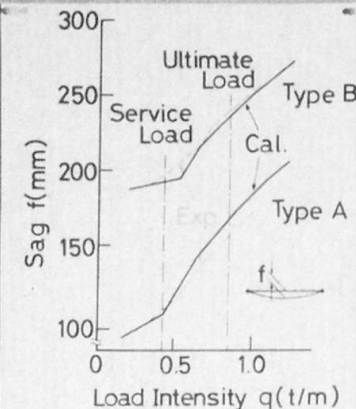


General View of Model Bridge

Various experiments and measurements to make clear the mechanical characteristics of pedestrian suspended-slab bridge have been carried out for a long period. As is possible to shorten the term of works, this type is suitable for the pedestrian bridge (span 50-100m) to cross not only the valley but also the street.



The elongation rigidity deteriorates suddenly when crack appears.



The sag increases suddenly when crack appears.

Resonance Frequency and Damping Constant

Crack Condition	Type A		Type B	
	Freq. (Hz)	Dam.Con. (%)	Freq. (Hz)	Dam.Con. (%)
No	510	1.4	758	0.9
Initial	343	—	714	—
Ultimate	310	1.6	376	1.6

As cracks appear, the resonance frequency decreases.



Proposed Hayakawa Bridge
(Span 113m, Width 2.85m,
Sag 2.65m)